

# "Brief comments on the status of TE1CAT003 & TE1CAT004"

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- RRCAT made two more single cell 1.3 GHz (2<sup>nd</sup> prototype) during 2011.
- TE1CAT003 arrived FNAL (May-11) & TE1CAT004 (August-11)
- TE1CAT003 underwent standard ILC processing recipe (consisting of bulk EP, 800°C furnace treatment, light EP, HPR, assembly & 120°C bake) & was quench limited to 15.5 MV/m with high Q (~2.6e10) (tested on 05 Aug 2011 ).

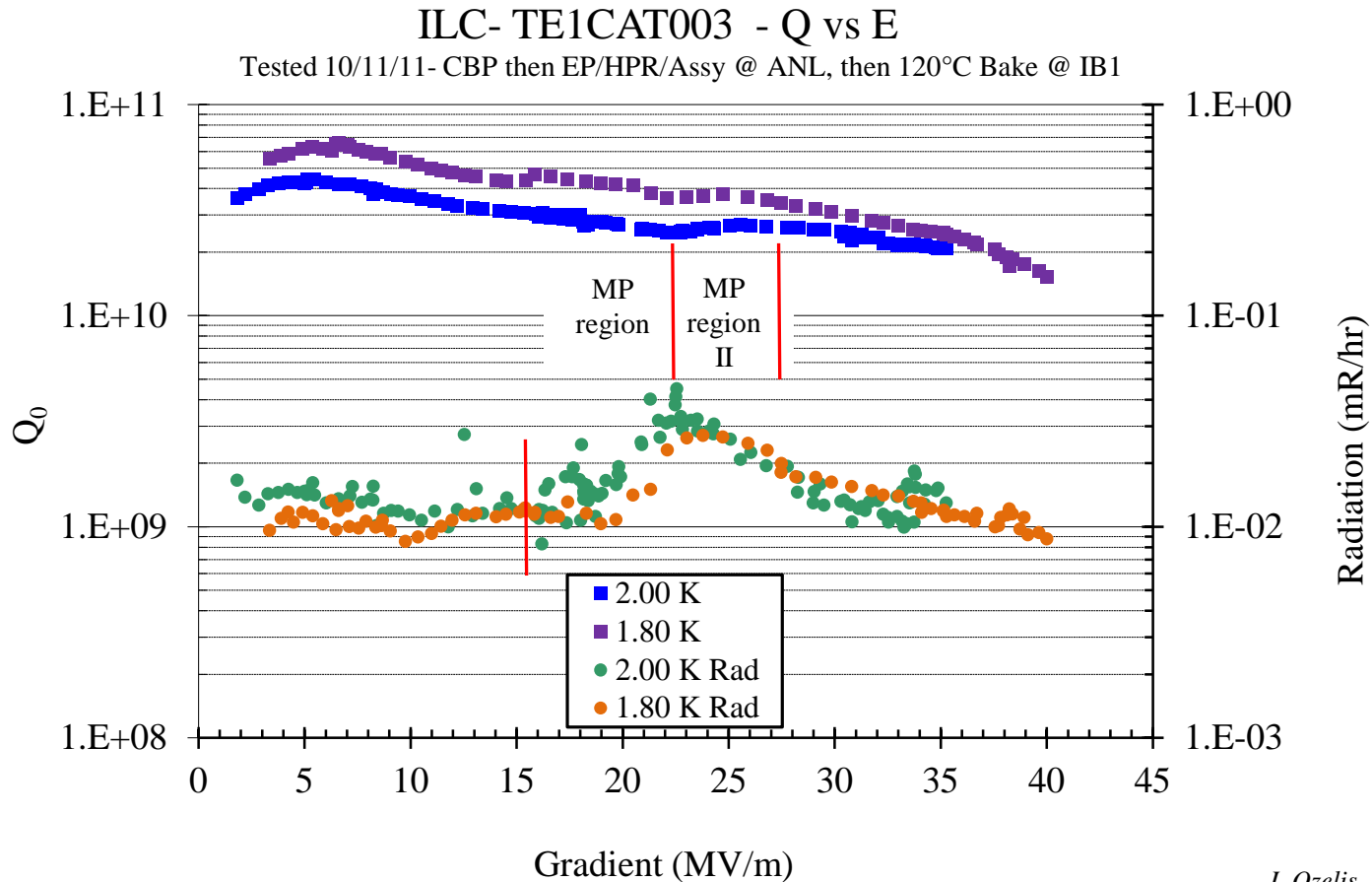


TE1CAT003



TE1CAT004

- Quench was due to bump (defect ) in cavity that was found in cavity by optical inspection (correlated with thermometry results)
- It was decided to remove machining marks & features after scraped bumps by Centrifugal barrel polishing with optical inspection between rounds.
- Followed by 20 $\mu$ m EP, 800°C heat treatment for 3hrs, then 10 $\mu$ m EP, then HPR/assy , 120°C bake out at IB1 (48hrs) before test.
- 2K VTS testing of cavity (11 Oct 2011).

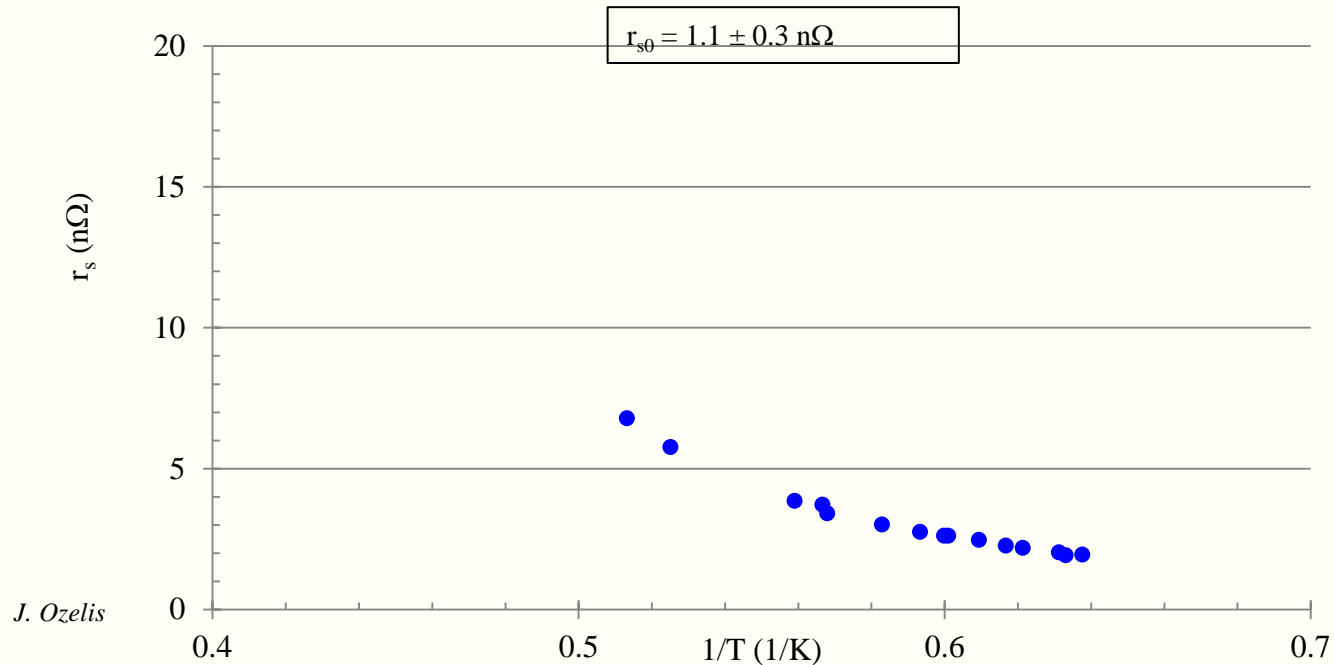


*J. Ozelis*

Achieved accelerating gradient **35.3 MV/m**, with a Q **2.1 x E10** at **2K** .  
 Accelerating gradient is limited by global thermal instability

## ILC-TE1CAT003 - Surface Resistance

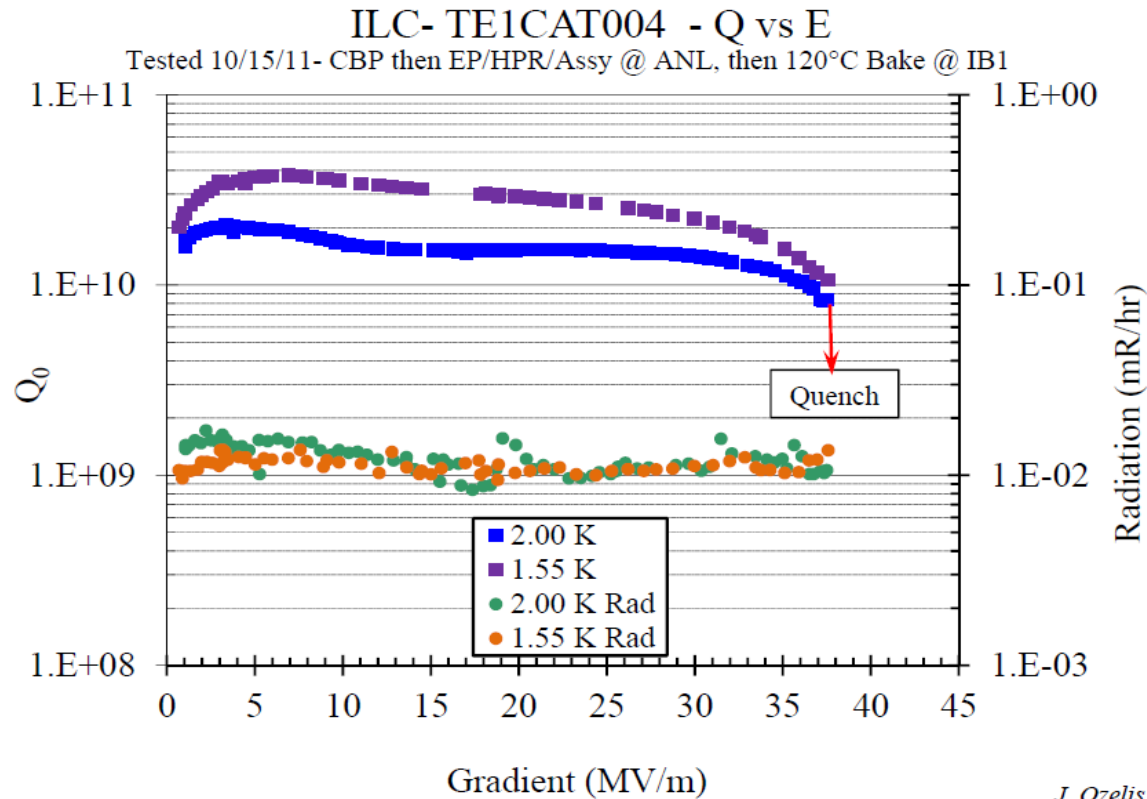
Tested 10/11/11- CBP then EP/HPR/Assy @ ANL, then 120°C Bake @ IB1



*J. Ozelis*

The residual surface resistance of  **$1.1 \pm 0.3 \text{ n}\Omega$**  – among the lowest measured at Fermilab. Surface resistance in general is very low for this cavity (as evidenced by high  $Q_0$  values throughout).

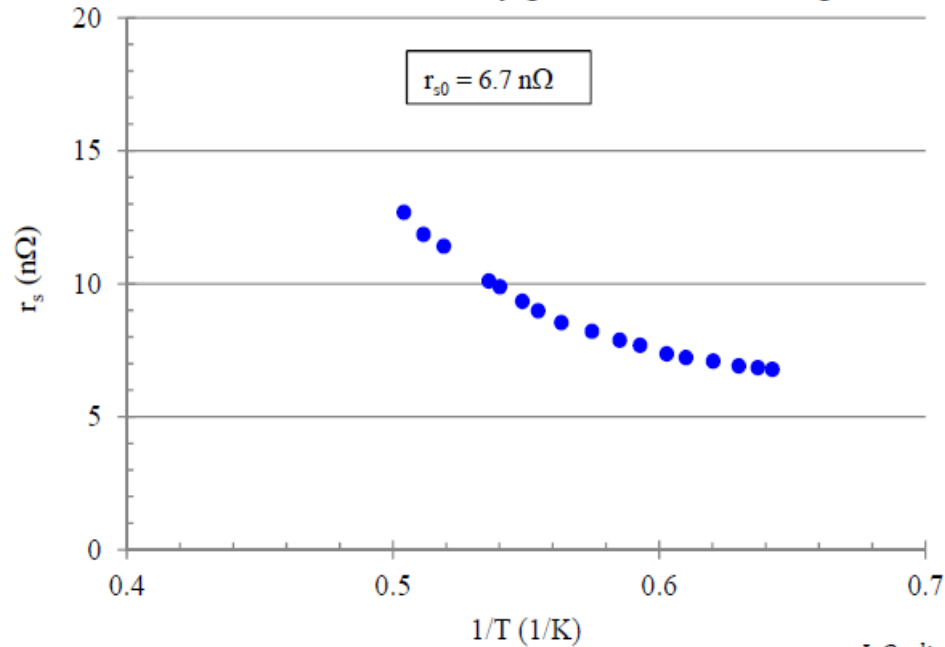
- **TE1CAT004 underwent optical inspection & found some weld features & machining marks will limit the performance of cavity.**
- **It was decided to do first Centrifugal Barrel Polishing in addition to standard ILC processing recipe (consisting of 20 $\mu$ m EP, 800 $^{\circ}$ C heat treatment for 3hrs, then 10 $\mu$ m EP, then HPR/assy , 120 $^{\circ}$ C bakeout at IB1 (48hrs) before test.**
- **2K,VTS testing of cavity (15 Oct 2011).**



Achieved accelerating gradient **37.5 MV/m**, with a Q **8.4 x E9** at **2K**. No Multipacting & field emission were observed at any time during testing. Accelerating gradient is limited by quench.

## ILC-TE1CAT004 - Surface Resistance

Tested 10/15/11- CBP then EP/HPR/Assy @ ANL, then 120°C Bake @ IB1



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The residual surface resistance was measured 6.7 nΩ .



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